0. Introduction: Lotteries: from a ludicrous idea to a plausible one

0.1 Non-market distribution and randomisation

For most things, most of the time, our standard of living depends on our wealth and how we choose to spend it. The market economy has been supremely effective at providing an abundance of products and services at prices which the consumers can afford. Those things which are distributed by non-market channels may seem of little concern, hardly worth exploring. Not so. Access to education at all levels is constrained by selection processes. Employment opportunities, getting a job, being promoted, becoming redundant are invariably matters of bureaucratic, not market-based procedures. It is education and employment which are the main determinants of earning potential, and hence our position in the economy.

The acceptable non-market means by which these valuable commodities are distributed is usually called 'merit'. The award of a school or university place is the starting point for our meritocratic society. Jobs and promotions should also be a reward for merit. I do not intend to challenge the ideal of a meritocracy, just draw attention to its shortcomings. It is at this point I would like to introduce my particular idea: When differences in relevant merit are small, then all candidates should be treated as equals. The best way to do this is by randomly distributing the limited supply of places or positions—in other words *by a lottery*. Even if significant and

relevant differences in merit are to be found, this should not *automatically* exclude those of lesser merit. All qualified candidates should be given a chance in proportion to their merits. In Chapter 3 I will show how a weighted lottery is being used to implement this ideal.

Apart from education and jobs, the most significant other life-transforming non-market transaction is that of choosing of a mate. Readers may be relieved to learn that I do not suggest that this 'marriage market' be transformed into a lottery[*]. There remain a few essential commodities which are sometimes distributed through non-market channels. Subsidised housing for the less-well-off has to be distributed by social agencies, because the market economy has not been universally successful. As Galbraith puts it: 'The inadequate provision of housing at modest cost in contrast with that of say automobiles or cosmetics, can be considered the greatest single default of modern capitalism' (Galbraith, 1987, p290). Here too, random distribution may provide an alternative to purely bureaucratic selection.

Some products are intentionally kept out of the market—children for adoption or kidneys for transplant—are examples where social norms prohibit sale to the highest bidder. Instead, bureaucratic procedures are used. In such socially determined allocations the justice of using the random arbitration of a lottery has been explored.

As a matter of operational convenience, firms and public agencies may also use non-market mechanisms like queuing to manage short-run excesses of demand. Whether a random distribution mechanism would be an appropriate alternative is a matter of efficiency and perhaps consumer preference.

There are other kinds of non-market transactions: Within producers' co-operatives division of their assets is a matter of choice amongst the members. When government

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[*] Although Barbara Goodwin (2005) in *Justice by Lottery* makes just such a proposal as part of TSL – a Total Social Lottery.

transfers public assets into private hands, this is often done by non-market means. This can be on a small-scale like the issue of licences to hunters, or involve large-scale transfer of public assets like the radio spectrum to commercial firms. Lotteries have sometimes been used for these non-market transactions.

The range of transactions which are outside of the market is very diverse. Despite the attractions of markets in providing for the welfare of consumers, most of the non-market forms of distribution are likely to remain outside the market. Their effectiveness and justice should be addressed. Whether these transactions can be enhanced by the use of randomised distribution is the subject of this thesis.

0.2 Review of the uses of random distribution

Using a lottery to decide who gets what has a long pedigree. The classical Athenians chose their representatives and administrators, not by election but by lot (Headlam, 1891). Later, in Renaissance Italy, the Venetian oligarchy divided up the important jobs amongst themselves using the 'ballotta'—drawing a ball at random from an urn. (Finlay, 1980). The practice of using a lottery to select young men to serve in the military dates back to Naploeonic times, but is best known as the 'draft' in the US during the Vietnam era. (Angrist, 1990). For most citizens, their main experience of a random selection is being called upon to serve on a jury. (Abramson, 1994). More frivolously, a lottery decided who may buy tickets for the 2005 charity mega-concert 'Live8'. The Wimbledon tennis championships uses a ballot for the chance to buy the best seats (more on this in Chapter 2).

There are other less well-known contemporary examples of the use of random distribution of prizes. For example; Golf-course playing times at St Andrews; licences to hunt alligators in Florida, Moose in Maine and big-horn sheep in Colorado. Student housing is also subject to random distribution in many US universities (more about this in Chapter 9). A lottery for places at medical school is organised annually

in the Netherlands—an example that is copied in a few other countries, and should be more widely known about—I will explain this in more detail in Chapter 3. Inspired by an earlier paper of mine (Boyle, 1998), Martin Wainwright, northern editor of The Guardian persuaded a committee to use a random process to pick candidates for a board to oversee the distribution of National Lottery funds. Some commercially valuable prizes have been given away by lottery: Landing slots at New York's la Guardia airport; oil drilling leases; telephone numbers; broadcasting bandwidths. (Details of these and other current uses of random distribution together with the sources used can be found on my website at   http://www.conallboyle.com/lottery/2-Ex-Current-L.html)

0.3 Previous analysis of random distribution:

My interest in the use of random distribution is directed at its economic aspects. There is already extensive analysis in other fields, but to date little from economists. Examples of writers who have examined the idea of using random distribution include:

Historical evidence: on Athenian democracy and the Venetian oligarchy have already been mentioned. Headlam (1891) is one of the few authors to concentrate on the random selection aspects. Other historical writers mention the lottery in passing such as Norwich (1977) on Venice or Wilms (1974) on the land-lottery in Georgia, US. Many references for historical sources can be found in works by Jon Elster.

Philosophical: Random distribution as an economic mechanism has been the subject of a number of papers from John Broome (1984a, b, 1990, 1994). Much of his research in the past has been in the border territory between economics and philosophy. He has examined the case for the use of random distribution in a number of papers—some examples can be found in the References.

Theological: 'The lottery, as Aquinas's position suggests, was regarded in medieval times as a means of getting God to speak', according to Duxbury (1999, p18). If the outcome of a random process was 'in the lap of the gods', then it would be blasphemous to invoke it for frivolous reasons. Some echoes of this could still be found in modern times, for example in the cavil, described in Chapter 6. Nor did the connection with gambling do much to redeem lottery choice in the opinion of the religious either.

Sociological: Jon Elster in his 1992 *Local justice: how institutions allocate scarce goods and necessary burdens* and in several other books describes many examples of 'social lotteries'. He is frequently quoted on this and other subjects.

Political: There is a growing corpus of work which proposes reforming the democracy through the use of random selection in the place of elections. Burnheim at Sydney, Australia (1985) produced *Is democracy possible? The alternative to electoral politics* where he proposed the ides of 'Demarchy'—all functions of society devolved down to the smallest units which would be ruled by juries. Barbara Goodwin at East Anglia has suggested an extreme version of random selection in her Total Social Lottery (2005). John Sutherland's 2004 *The Party's over* suggests replacing M.P.s with a grand jury of citizens selected at random, or alternatively an *ad hoc* jury to review each piece of legislation. Reform of the House of Lords has similarly produced suggestions that the Lords be replaced by a jury drawn from the electorate—the Demos think-tank published a pamphlet on *The Athenian option* (Barnett, 1998) to this effect.

Legal: Neil Duxbury at Manchester in his 1999 *Random justice - on lotteries and legal decision-making* explores not just juries, but also wider aspects of the law in relation to random selection. After a thorough-going analysis of various aspects of random distribution he concludes (p175) that he had turned 'a ludicrous idea into a dubious one.' Of course I hope to go a bit further, and show that the idea of using random distribution is an eminently plausible one, economically speaking.

Administrative: There are general descriptions of administrative behaviour, notably by Herbert Simon (1976). This was based on first-hand observation of a large bureaucracy in operation. This did not include any procedures involving random distribution or allocation. There are however, a few analyses which assess the validity of random distribution as an administrative tool in a specific application: The Drenth Commission in 1997 investigated the workings of the lottery-based allocation system used in the Netherlands for places at university medical schools (of which a great deal more will be heard, especially in Chapter 3).

Statistical: Understanding and interpreting Randomness is at the core of statistics. It is not surprising therefore that comments about the practicality of applying randomness to the results of Civil Service entrance examinations, or grades of degree at Cambridge came from Francis Ysidro Edgeworth, who was well-known both as an economist and as a statistician. (Edgeworth, 1888 & 1890). I have tried to follow this statistical line with a paper: 'Organizations selecting people: how the process could be made fairer by the appropriate use of lotteries' (Boyle, 1998).

Economics: For such an essentially economic phenomenon as the distribution of goods by lottery there is a surprising dearth of literature. I have found only one paper, that by John Boyce 'Allocation of goods by lottery' (1994) which directly deals with the topic[*]. His primary interest lies in environmental economics, in particular the effect of allocating hunting licences by lottery, but his approach is more general. Boyce used three approaches to test the plausibility of random distribution. The first is 'elicitation', which is a form of opinion polling. A cross-section of the population is asked to comment on different means of rationing scarce resources, including by lottery. The second economic approach is to gauge the extent of wasted effort expended in trying to win a prize. This is the well-known idea of rent-seeking.

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[*] Two other economic papers are more narrowly focused: Kerr (1995) compares the fairness and efficiency of either rationing by price or by lottery as a means of distributing publicly owned assets like hunting licences. Taylor et al (2003) compare the customer benefits of queuing with lottery distribution. I will return to both papers in Chapter 2.

Thirdly, Boyce considered <u>General Welfare</u>: to what extent distributing prizes by a lottery evens up the benefits between rich and poor. Boyce's analysis starts from the usual economic assumption of purely self-interested behaviour, especially on the part of the applicants. This leads to useful insights where quasi-consumer goods like licences to hunt wild animals are concerned. When goods with some collective dimension are concerned—education is the main exemplar—then notions of inter-personal comparison, fairness and justice will also be involved. Drawing on more recent work from experimental economics on human behaviour, I hope to develop a fuller understanding (in chapters 6 and 7) of how random distribution can enhance the welfare of individuals in a social setting.

0.4 Examples of random distribution: A case-study approach

When approaching an idea as unfamiliar as random distribution, it is helpful, I believe, to first look at several examples where it is used. From an understanding of what is going on in a number of actual situations it should then be possible to draw out a more general economic case for random distribution. Chapters 1 to 7 give examples of the use of random distribution as follows:

1. Choosing who should get a scarce medical treatment
2. Distributing cut-price tickets for the Wimbledon tennis championships
3. Selecting entrants for medical school in the Netherlands
4. Allocating telephone numbers for deregulated directory enquiries in the UK
5. Deciding who will be made redundant in state-owned enterprises in China
6. Distributing workplaces amongst miners in the Durham coalfield
7. Awarding a Green Card entry to the US

Each example is drawn from a different allocation context. Non-market distribution can arise in diverse ways. Firms may choose to distribute their goods to customers by lottery, such as Wimbledon. Public agencies may select entrants this way as in the Netherlands medical school. Within a group, workers may distribute benefits amongst

themselves randomly as, in effect was the case with the Durham miners. Governments may give away telephone numbers to commercial firms by a lottery.

Working from these examples I hope to strengthen the case for random distribution:
  – by giving *credibility* to a generally implausible idea
  – by showing that it can be *viable* in real-life situations
  – that it can be a *robust* method of distributing goods and benefits
  – having survived against competitors, it is *fit-for-its-purpose*

Here I am using the idea of evolution, rather than any specific school of Evolutionary Economics. Vernon Smith (2005) explains 'Emergent arrangements … must have survival properties that take account of opportunity costs and environmental challenges', an idea he ascribes to Adam Smith. There need not be a conscious creator for mechanisms that evolve, but we can learn from them how they emerged and survived. Hodgson (2002) discusses various interpretations of Darwinian and biological analogies in economics.

Another feature of the examples which are produced in each chapter is the opportunity they give to introduce some form of economic analysis. When considering the economic merits of a *form* of distribution, a variety of approaches could be employed. Rather than first discussing all the various methodologies, I will introduce a form of analysis in each chapter, as appropriate. How this all fits together is shown in Figure 1, over.

Figure 1: Structure of the Chapters

Chapter Number	EXAMPLE – the prize	CONTEXT	FORM OFANALYSIS
INTRO-DUCTION		A–agent G–Govt B–Business P-peer, people, customer	-Evolutionary Economics
1 Tragic Choices	Emergency Medical Treatment	A_G to P A_B to P **(urgent)**	- Elicitation & Prospect Theory -Public Choice Theory -General Welfare
2 Sporting Chances	Wimbledon tickets, (hunting licences)	**B to P** **(club)**	-Rent-seeking -General Welfare (Public Choice Theory)
3 Glittering Prizes	Medical School entry – Netherlands	A_G to P **(routine)**	- Measuring educational Merit - Evaluating Expertise
4 Lucky Numbers – Nice Business	118 phone numbers	A_G to B	-Design of Economic Mechanisms
5 Fortunes in Organis-ation	Sacking in China *luangang*	A_B to A (P) A_G to A (P)	-Information Theory -Equal opportunity, law
6 Share Common-Wealth	Workplaces in mines in Durham coalfields *Cavil*	**Peer to Peer**	-Reciprocity -Inter-personal comparison
7 Stake in Democracy	Green Card diversity program	**G to P**	-Justice & Fairness
8 Why RD Works			-Subjective Well-Being (Happiness)
9 Future Lot Casting			

Distribution mechanisms should be efficient, and fulfil the aims of the principals who produce the prizes. But the ultimate test of any proposed economic mechanism must be the Mills-Utilitarian idea of 'the greatest good of the greatest number'. Unless a proposed change in the method of distribution leads to the ultimate improvement in the welfare of people, it will be a failure. I take as axiomatic that the economy exists for the benefit of all the individuals within in it, not the other way around. I hope to show that for many of the existing cases of random distribution, it produces a good deal for the people involved; and that there are many more situations where the unlikely mechanism of random distribution could be used to improve people's lot.

By exploring a wide range of examples in varying contexts, and by drawing on many sources of information and research data, I hope to understand a particular form of economic mechanism. I will also draw on many different economic theories to provide some explanation. It is not possible to be expert in all of these diverse fields, and my lack of depth of knowledge may be all too obvious. But the nature of what I am attempting to achieve requires breadth of understanding, so I have perforce had to stray into unfamiliar areas of economic science, perhaps even uncharted ones. It is my intention to honestly present what I have found. Any fundamental blunders which I have made are my own, and I would be grateful to have them pointed out.